WHAT IS CLAIMED IS:

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ľ	1. A method for real time determination the of mineral scale deposition rate from	m
2	a formation fluid comprising:	
3	A) placing an optical probe having a probe surface which can measure	
4	changes in refractive index at the probe surface, into contact with a	
5	formation fluid produced or being produced from an oil well;	
6	B) measuring the changes in refractive index at the probe surface; and	
7	C) determining the on-set and rate, if any, of mineral scale deposition from	
8	the formation fluid as a function of the changes in refractive index at the	
9	probe surface;	
10	wherein:	
11	i) the probe surface which can be monitored for changes in refractive index	is
12	in contact with the formation fluid;	
13	ii) the probe, including the probe surface which can be monitored for change	es
14	in refractive index, is composed of a material which can withstand an	
15	extended period of contact with the formation fluid at the temperatures ar	nd
16	pressures present in oil wells; and	
17	iii) the determination of on-set of mineral scale deposition and the mineral	
18	scale deposition rate from the formation fluid takes place in real time.	
1	2. The method of Claim 1 wherein the optical probe having a probe surface	
2	which can measure changes in refractive index at the probe surface is an ATR	
3	probe.	
1	3. The method of Claim 2 wherein the ATR probe includes a means of	
2	measuring the refractive index change associated with a material in contact with the	ıe

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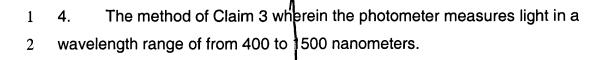
probe which is a photometer.

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- The method of Claim 4 wherein the photometer measures light in a wavelength range of from 500 to 700 nanometers.
- 1 6. The method of Claim 5 wherein the photometer measures light in a wavelength range of from 630 to 690 nanometers.
- 7. The method of Claim 4 wherein the photometer measures light in a wavelength range of from 800 to 900 nanometers.
- 1 8. The method of Claim 7 wherein the photometer measures light in a wavelength range of from 850 to 900 nanometers.
- 9. The method of Claim 8 wherein the photometer measures light in a wavelength range of from 870 to 890 nanometers.
- 1 10. The method of Claim 1 additionally comprising using an automated probe 2 cleaning device to clean, calibrate, insert and extract the probe surface.
- 1 11. A method for controlling mineral scale deposition from a formation fluid 2 comprising:
 - A) placing an optical probe having a probe surface which can measure changes in refractive index at the probe surface, into contact with a formation fluid produced or being produced from an oil well;
 - B) measuring the changes in refractive index at the probe surface;
- C) determining the on-set and rate, if any, of mineral scale deposition from the formation fluid as a function of the changes in refractive index at the probe surface;

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0	D)	comparing the rate, if any, of mineral scale deposition, to a predetermined
1		range of acceptable mineral scale deposition; and
12	E)	effecting a change in the rate of addition, if any, to the formation fluid of an
13		additive effective for preventing mineral scale deposition from a formation
14		fluid ;
15	wherein:	
16	i)	the probe surface which can be monitored for changes in refractive index is
17		in contact with the formation fluid;
18	ii)	the probe, including the probe surface which can be monitored for changes
19		in refractive index, is composed of a material which can withstand an
20		extended period of contact with the formation fluid at the temperatures and
21		pressures present in oil wells;
22	iii)	the determination of the mineral scale deposition rate from the formation
23		fluid takes place in real time; and
24	iv)	the rate of addition, if any, to the formation fluid of the additive effective for
25		preventing mineral scale deposition from a formation fluid is:
26		(1) increased when on-set of mineral scale deposition is detected or
27		the mineral scale deposition rate is greater than the range of
28		acceptable mineral scale deposition;
29		(2) decreased when no mineral scale deposition is detected or the
30		mineral scale deposition rate is less than the range of acceptable
31		mineral scale deposition; and
32		(3) unchanged when no mineral scale deposition is detected or the
33		mineral scale rate deposition is within the range of acceptable
34		mineral scale deposition.
1	12. Th	ne method of Claim 11 wherein the optical probe having a probe surface
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1 12. The method of Claim 11 wherein the optical probe having a probe surface which can measure changes in refractive index at the probe surface is an ATR probe.



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- 2 measuring the refractance of a material in contact with the probe which is a
- 3 photometer.
- 1 14. The method of Claim 13 wherein the photometer measures light in a
- 2 wavelength range of from 400 to \$1500 nanometers.
- 1 15. The method of Claim 14 wherein the photometer measures light in a
- wavelength range of from 500 to 700 nanometers.
- 1 16. The method of Claim 15 wherein the photometer measures light in a
- 2 wavelength range of from 630 to 690 nanometers.
- 1 17. The method of Claim 14 wherein the photometer measures light in a
- 2 wavelength range of from 800 to 900 nanometers.
- 1 18. The method of Claim 17 wherein the photometer measures light in a
- wavelength range of from 850 to 900 nanometers.
- 1 19. The method of Claim 18 wherein the photometer measures light in a
- wavelength range of from 870 to 890 nanometers.
- 1 20. The method of Claim 11 additionally comprising using an automated probe
- 2 cleaning device to clean, calibrate, extract and insert the probe surface.
- 1 21. A system for controlling mineral scale deposition from a formation fluid
- 2 comprising a fluid flow path for flowing formation fluid recovered from a subsurface
- formation; an optical probe having a probe surface which can measure changes in
- 4 refractive index at the probe surface associated with the formation fluid in the fluid
- flow path providing data corresponding to the rate of deposition of mineral scale from

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the formation fluid in the fluid flow path; and a processor for determining from the data the rate of deposition of mineral scale from the formation fluid.

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